

Integration of Outcrop and Seismic Data to Delineate a Structural Devonian Carbonate Reservoir in the Rocky Mountains of Northeast British Columbia, Canada

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A major north-south trending structure, the Bernard Anticline, has long been known from surface geological mapping in the Rocky Mountains north of Williston Lake, British Columbia. The size of this undrilled structure at surface (60 km long and 10 km wide) and recognition of potential reservoir facies in dolomitized Middle Devonian reefal carbonates exposed near the structure's southern plunge led to exploration interest in this area. Initial integration of the outcrop interpretations and some vintage seismic data suggested a prospective Middle Devonian carbonate trend could exist below the surface thrust, lithologically similar to an unstructured carbonate bank edge field (1.6 Tcf) some 260 km to the north.

To pursue the exploration possibilities of the suggested thick-skinned duplexing beneath the Bernard structure, a high fold/ long offset heliportable seismic program was designed and recorded, with excellent results. This program partly covered the Devonian outcrops, thus aiding the seismic stratigraphic interpretation at depth. Prestack time and depth processing confirmed the presence of a large duplexed structure. Palinspastic reconstruction of the newly interpreted structures below the surface anticline and their relation to the suggested regional distribution of potential Devonian reservoir facies led to the drilling of an exploratory test well by Anadarko Canada and partners.

Data from this well generally confirmed the seismic structural interpretation, and the proposed regional carbonate facies distribution was supported by cores from the excellent reservoir facies encountered. However, the well tested fresh water wet, indicating a direct linkage to surface water recharge. At this time the nature of that linkage is not known.